Precision SHOOTING

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a magazine for Shooters by Shooters

Precision SHOOTING

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COVER PHOTO

Shooting bench arrangement in the front of Les Bowman's shooting shed at his LB Ranch near Cody, Wyoming. Photo was made through the window of his loading house at back of shooting shed. The bench used for target accuracy testing is on the left and the one on the right is for his chronograph testing. Note the different types of front rest pedestals, including the Womack Twin-Set outfit on the extreme right. Les is evidently a "sand-bagger" and all the bags shown were made by Basil Tuller of Galeton, Penna.

While Les Bowman's chief business is a big game hunting guiding and outfitting service in a fabulous hunting area of Wyoming, as a result of his very extensive test shooting experiences become quite widely known as a gun writer. Part of his writing includes service as U. S. correspondent for one of the Australian shooting magazines.

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COUNTY OUTDOOR RECREATION

Leisure can be a blessing or the curse of a successful civilization. Most Americans face the prospect of more leisure time in the future.

Activity freely chosen, is refreshing and interesting to do—then it serves the basic function of recreation—the task of recreating human vitality.

The outdoors lies deep in American tradition, it has had immeasurable impact on the Nation's character and on those who made its history.

Millions of acres of American landscape are being converted to subdivisions, shopping centers and industrial plants. Today's challenge is to assure all Americans permanent access to their outdoor heritage. Exploit for the present, for the greedy, or shall we conserve for future generations? A health gift, hiking over the hills, tramping the woods and streams makes for sturdy bodies.

Parks and boat facilities are only part of the answer. Are there streams nearby for an afternoons fishing, have they been buried in concrete culverts, are they flowing sewers of filth and pollution?

One of the most pleasurable of outdoor pursuits is hunting rabbits, bird or big game. In recent years with the scarcity of game the hunter has turned to target shooting. The revival of the old black powder muzzle loading matches is another element of shooters interest. There loading of brass cartridge cases, with lead bullets at low velocity is yet another facet of a revival of the old, when every hamlet had a place to shoot mark. With prizes to those that could hit the (X) mark, chickens, turkeys, jewelry, rifles, etc., just good clean outdoor fun.

One of the reasons there are so few public rifle ranges today, most of we Americans are ashamed or afraid to speak about the enjoyment of target shooting or hunting. The history of our country's military success has reflected the quality of our civilian marksmanship. However and unfortunately of more recent years, the foreign shooters lick the pants right off us—the United States of America.

Exception, at the 1964 Olympic games in Japan, a U. S. A. shooter won the 300 meter Free Rifle Match, incidentally it had been forty years since Morris Fisher won the 300 meter event for this country. Such a pity our reporters did not give that gold medal winner a little publicity, it may be fifty years before we win it again. Unless, there are some provisions made for our boys to train, the foreign shooters have the finest of ranges and training facilities. So, they win regularly.

The question of public county rifle ranges begs to inquire a little further. Tax dollars are spent for golf courses, swimming pools, and for other reasons, why, are the county fathers so lax on providing rifle ranges? There are modern, safety built public rifle ranges in California and in New York.

The costs for use are much less than an individual club could provide, with safety and sanitary facilities. Best of all, the small fry can safely participate.

What is needed, are local groups Rod and Gun, and Rifle Clubs to co-operate, form a county committee and help preserve some of the remaining natural landscape, and to help in obtaining public rifle ranges, near urban centers where many can enjoy same. Federal assistance is available **now**, technical, financial and in some instances labor will be provided.

F. Harper
807 East 95th Street, Cleveland, Ohio

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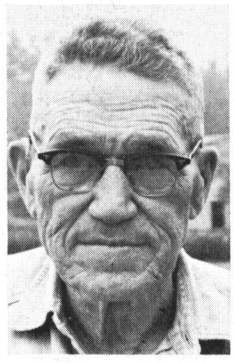
THE HANDLOADER MAGAZINE

Dave Wolfe who, as an employee of the Peoria Journal Star (Ill.), originated and for the past six years has been editor of Shooting Times magazine, resigned that position effective December 1st. He has now established his own Dave Wolfe Publishing Company which will publish a new entry in the shooting periodical field, The HANDLOADER Magazine.



Phil — P. H. T.

The proposed content of the new magazine will cover the entire ammunition handloading field, handgun, rifle and shotgun. Publication will begin on a bi-monthly basis. The first issue is scheduled to appear in April and will bear a May-June date-line. A minimum 60 page issue is promised at start.

The cost of the magazine will be 75¢ per single copy and mail subscriptions $4.00 per year (six issues). The firm's address is: Dave Wolfe Publishing Company, 700 Park Avenue, Peoria, Illinois 61603.

P. H. T.

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THEY CAN'T KEEP UP

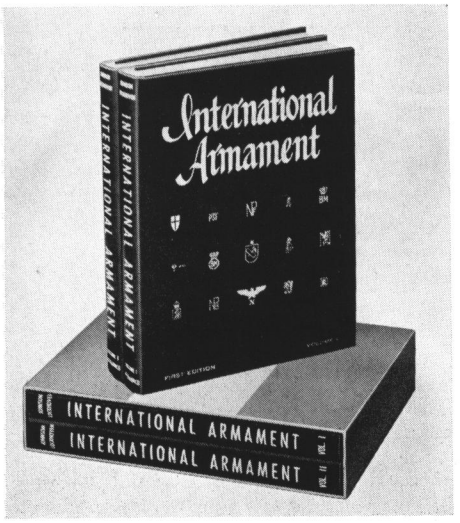
Publishing present day ammunition reloading manuals is a major physical and financial undertaking. The quantities of a printing necessary to permit sales at a reasonable cost makes it impractical to print annual editions. Therefore, loading manuals in the hands of most reloaders do not contain loading data for the numerous new cartridges and some components that have been introduced in the last couple of years or so.

To help out on this problem, Speer has been issuing supplemental sheets with loading data for the new cartridges and, of late, for the Hercules ReLoader rifle powder. We believe Speer is now working on compiling the data for a new Number 7 edition of their manual but we have no idea when it will be available.

We have no idea of what Lyman may be planning or perhaps doing. Loading data sheets for particular cartridges with Hornady bullets may be obtained on request from the HORNADY MANUFACTURING COMPANY, P. O. Box 906, Grand Island, Nebraska 68801. Loading data for most cartridges using Norma bullets and both Norma and U. S. powders may be obtained from NORMA-PRECISION, South Lansing, New York for, at most a very moderate charge.

So, if you have one of the new cartridges but little or no reloading data, you can get it with very little effort and/or cost.

P. H. T.



INTERNATIONAL ARMAMENT

954 pages . . . 8½X11" . . . Weighs 6½ lbs.
by George B. Johnson and Hans Bert Lockhoven)

INTERNATIONAL ARMAMENT, the small arms reference books just published by INTERARMCO, is a thorough and highly authoritative treatise on over 400 significant firearms.

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The library slip-cased collector's FIRST EDITION of **INTERNATIONAL ARMAMENT** is limited to 8,700 2 volume sets, and is now available from your local book or sports store,, or $35.00 postpaid ($5.00 down and $5.00 a month for six months). Write for Free Brochure from GUN DIGEST ASSOCIATION, Dep't PS, 4540 West Madison St., Chicago, Ill. 60624.

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KNOW THE LAWS

Is it legal to ship a shotgun to a friend in another state? What about a handgun? Ammunition?

Sooner or later, says the National Shooting Sports Foundation, almost every sportsman will run up against questions like these. And if you don't know the answers, warns the Foundation, you may be in danger of breaking the law.

There are roughly 20,000 federal, state, county and city firearms laws. Anybody who handles firearms should know the laws of his own state and those covered by the Federal Firearms and National Firearms act.

For complete information on your state laws, check your state or local police. Federal laws are explained in five government publications, three of which are free:

—Firearms Laws Enforcement Guides. No. 399 (Rev. 4-65)

—National Firearms Act and Federal Firearms Act. No. 364 (Rev. 3-64)

—Interstate Traffic in Firearms and Ammunition. (Fed. Firearms Act) Part 177 of Title 26. No. 417 (Rev. 1-65)

These may be obtained by writing: Alcohol and Tobacco Tax Division, Internal Revenue Service, U. S. Treasury Department, Washington, D. C.

Two other publications may be ordered from: Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. These are:

—Machine Guns and Certain Other Firearms. (Nat. Firearms Act) Part 179 of Title 26. No. 232 (Rev. 1-63). .15¢

—Disposition of Seized Personal Property. Part 172 of Title 26. No. 348 (Rev. 10-63) .10¢

In order to get the correct publications, sportsmen are advised to use the complete listing when ordering publications.

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PROPOSED .224 LONG RANGE RIFLE

By Paul Wright

There is need for a small caliber, light recoil, super accurate rifle for long range target and hunting use. Requirements for this rifle are: It must be pleasant to shoot, free of the big bang and recoil which hurts good scores, either consciously or subconsciously. The bullet's flight must have about half the trajectory at 1000 yards that our big 300 magnums have, and about half the wind drift. By this latter, I mean the effect of wind or mirage on the bullet.

The above is possible and I will outline complete steps later in this article. There are theories which as example state: "the only way to get less wind drift is to go to a heavier bullet—speed of bullet has little or no effect, but weight, plus loss of velocity during bullet flight, controls wind drift." Part of this may be true, but I have completed some exhaustive tests that repudiate some of the above. I have, with the help of some authorities such as Joe A. Deckert (World Champion Doubles Running Deer Target 1958, Member NRA 250 Club, Leech and Presidents winners), established that the 139 gr. 6.5 Norma Match bullet at 3400 M. V. had just half trajectory the 30-06 Super Match ammo had at 1000 yds., also just half the wind effect. By comparison at Camp Perry, I also learned that this 6.5 bullet at 3400 M. V. had two thirds of both trajectory and wind effect that our big 300 magnums had, using the 200 gr. match bullets in the three 1000 yds. matches—the Wimbledon, the Leech, and Herrick. The 6.5 bullet above was fired in the WWH case (the 300 Weatherby case necked to 6.5 . . . initials for me (Wright), Weatherby for case, and H for Hoyer who took an interest to make the guns). This was all made from and for available parts and components. Load was 84 gr. H870 ball powder Fed. 215 primer and above-mentioned bullet. Some others use H202 ball powder of about 86 or 87 gr.

My new cartridge (but there is admittedly nothing new under the sun) would be a bullet that would be proportionately much longer than the 139 gr. Norma Match. It should be a .224 cal. and weight 100 gr. It would be 1¼" long. Don't ask how I know these figures. I didn't use a computer or higher mathematics. I will explain I merely picked out a beautiful little 68 gr. Ordnance experimental boat tail bullet, Sierra made a few years ago for testing. It was a scaled down version of their 180 gr. 30 cal. Match King. I cut it in two midway then cut a section of another .224 bullet body to fill in and make a composite bullet of 100 gr. 224" and a beautiful long streamlined projectile. If scaled up, it would be one quarter inch longer than the 6.5 Norma Match in 139 gr. and in 30 cal. it would be

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NORMA AMMO IN .223 CALIBER

NORMA-PRECISION of South Lansing, New York announce the availability of NORMA loaded .223 caliber ammunition at their dealers. The cartridge is loaded with a 55 grain spitzer soft-point bullet with an advertised muzzle velocity of 3300 F. P. S. and energy of 1330 foot pounds. At 100 yards, velocity is 2900 f. p. s. and energy 1027 ft. lbs.

The .223 cartridge is quite similar to the Remington 222 Magnum in size and general performance, **but the two cartridges are not interchangeable.** The .223 barrels are rifled with a 12 inch twist and therefore handle best the heavier 55 through 63 grain available bullets.

Speer loading data for the .223 cartridge with 55 grain bullets is very similar in charge weights and velocity to that for the Remington 222 Magnum and velocity similar to the Norma load. For the lighter bullets, charges and velocities listed are lower than for the 22 Magnum. **I'd guess** that might be because of the faster twist there might be an accuracy falling-off at velocities that might be safely possible with the shorter, lighter bullets.

The .223 now being a standard U. S. military round with huge amounts of the ammo now being manufactured may aid in gaining it popularity and desirability as a civilian cartridge. I wonder if it may not eventually make the Rem. 222 Magnum an obsolete cartridge. P. H. T.

TOP ACCURACY BULLET MAKING

By Crawford H. Hollidge

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Nearly a quarter of a century has rolled by since I made my first jacketed bullets and after all that time, I'm more certain than ever that many of them were not of "Top Accuracy" class. I feel sure also that you, too, even though you study every thought in this article, will find that your attempts at bullet making will sometimes fall below the top but my belief is firm that you may gain something.

Why do we go through this procedure of so many steps and so much time? It's not for the sake of economy for you are going to shoot a great deal more often and if you demand the best you will be giving away, throwing away or "plinking" more bullets than you used to buy in factory boxes. You should not sell factory bullets short because some of them are very fine and their makers are daily taking steps to make their products better; however, after thousands of comparisons in very careful tests, I still must find in favor of the best home made or custom made units.

To start with, you must sincerely like to make bullets and feel deeply that every act at every stage is an accomplished step toward a bullet that will spin truly toward the point of aim. If you find it an unattractive chore to make them, you had better never start because they are then much less expensive to buy. Remember always that the name of the bullet goes along with each trajectory. The wind, mirage, light or the condition of the barrel, gun, scope or "nut" behind the butt are all less likely to be blamed than the bullet. Perhaps this is because the powder, charge, primer, and bullets are at each shot committing their first and only effort. Yes, confidence is the most important asset to a good bullet. You can't drop one on the floor at any stage and put it back into the lot, neither can you accept "just a little" difference in pressure, nor a bruised or nicked core or jacket. Reject and reject if you are to make bullets that scream your name down the flight path.

So having determined that we will make and use good bullets, let us think about some of the hardware available to the home operator. The best possible jackets are essential and there are not even any close seconds in the field to those provided by Sierra and by no means have they been satisfied with their leadership but constantly have improved their products. The do-it-yourself shooter never had a more interested or better friend than this firm. An alert dealer will probably carry two or three lengths for each caliber. For instance, for benchrest type open point bullets in 22 caliber and a six or seven ogive point die cavity the suggested lengths and weights would be .690 45-50 grains, .705 50-55 grains, .735 55-60 grains. Generally the best balanced bullets have the lead line falling about one bullet diameter below the point and this makes the weight hit close to the middle of each bracket; viz. 48, 52.5 or 57 grains.

The advantages of high quality and true diameter and cylindrical shape of the lead wire are a much neglected factor in good bullet making. It must be smooth and correspond to the foregoing when you buy it or you must make it so by redrawing it. This is time consuming. I know, but since straight lengths of smooth, well dimensioned lead aren't available in most sections of the country, you will have to take that step and probably make your own draw dies, too. In that case, bore, ream and lap and polish stepped down holes (5 or 6 ought to do it) in a piece of ¼ or ⅜ spring steel. The entrance side of the hole should be chamferred before final polish and hardening. Sharpen about two feet of the lead wire with an old pencil sharpener and pull through by gripping end of wires with pliers. Sometimes a little soap and water lubricants helps but don't forget to draw all lengths through the same holes.

I made my first dies from a piece of Ford Axle and drill rod by regrinding a center drill, using cast cores and fired rimfire cases but today dies are a far cry from those. Generally speaking the quality of the dies is in direct proportion to the price. Most inexpensive ones wear out too fast or are never properly shaped or dimensioned and finished inside. Some of them even stretch and continue to enlarge. Recently there have been dies made featuring carboloy inlays and they make fine bullets over a long period of unabused time. They cost about a dollar a day out of the year budget so I warn about abusing them.

The foremost dies were developed by Biehler and Astles (B&A) and were for a period of ten years never matched. Unfortunately they are no longer available but a set of used ones in good condition will cost as much as when new; however, they will still make more good bullets than a basketful of some made by later makers. Dies are like barrels or telescopes in that some are outstandingly good and another off the same line may be as sour as a lemon. Good treatment will add scores of thousands of bullets to the life of the die and it is worth every effort.

Excellent bullets can be produced in a number of presses. There are more poor ones than good, mainly because of workmanship rather than design although some give too much under pressure. The worst failures come because the die recess and rams do not line up. This makes for poor reloads as well as ruining otherwise well made bullets. The position on the bench and convenience of and ease of lever action are to be considered since there are four thousand stroke cycles for each thousand bullets.

I've tried most of the old as well as the new presses and if I could come by a new

Crawford H. Hollidge

set of RCBS type B's, I would be very pleased but they are long since out of production. I would next take the RCBS Jr. for bullets up to 270 but although the RCBS A2 is a little slow and cumbersome, it is easier on the arm and shoulder muscles for the 270, 7m/m and .30 caliber. You can get by with one press but if you make a lot of bullets, a separate set-up for core forming, core seating and final bullet swaging will be handy.

I thought I couldn't be happy until I bought a hydraulic press. It is a nice set-up for the larger calibers but actually isn't as fast as any hand press even though it is less fatiguing. It is much more serious if you pinch a finger and you might easily lose one. I'm fairly savy about power equipment but I'm a little chagrined about the number of die parts I've had to replace while using that press. When that ram comes up something has to give and a fumbled unit in the die looks as deformed as a 30-06 fired into a gravel bank. Sometimes, the punch looks pretty unnatural, too.

A counter system is pretty important on any press and an automatic device to reach in and catch the finished item from the die and deposit it in a container is pretty handy. Makes it necessary to only dodge those moving parts the one time as you feed the die. Considerable production speed is obtained because the power hand does not have to leave the press handle. You should develop a speed of one thousand plus units an hour and avoid spoilage or pinched fingers.

The foregoing has described some of the equipment, state of mind, items to purchase, etc. so now let's get in to some of the technique that I've developed and that has worked for me; also, a flier here and there about some of the tricks that other makers use. We will talk about bullets with hollow points and flat bases because they are invariably on the whole more accurate than other types within 300 yards. Lead pointed flat based bullets are much more deadly at all ranges but some accuracy is sacrificed. Solid points are readily made if the point is not too sharp but if a real "Spitzer" type is required, additional steps and dies must be added. Its accuracy and the same bullet performance can be expected at most long varmint ranges by

the hollow pointed jobs. The procedure sequence and techniques for .22 caliber apply to all other calibers if you would have the best. The bore and groove diameter of your barrel should be known to you, and the bullets made to the groove diameter plus or minus two ten thousandths will probably work best. The word is right "probably" because there is no positive assurance that I've ever cared to make. It's my firm belief that a die only makes one size bullet **perfectly.** I know you can make smaller bullets as well as larger ones in that same die but in either case, the final bullet is not truly round.

A very accurate scale is an even more important requirement to bullet making than it is to reloading. Throughout all steps it is hand and hand with the micrometer as an instrument for quality control. One starts right out to use it by determining the proper length to cut the core. My system is to make the initial cutting which is generally referred to as a "slug" 1½ grains heavier than the required core for a 52.5 grain .22 caliber .705 length jacket bullet. for the 6 m/m and .25 caliber, two grains heavier and three grains heavier for the desired .270, 7 m/m or .30 caliber bullets.

CORE CUTTING

We have always accented the importance of pure (virgin) lead in straight lengths two to four feet long free from galls, abrasions, scores. Reasonable uniformity of length is a good feature in the lead wire strip because it gives the advantage of determining how many slugs can be cut from a length and enables you to estimate the number of strips required for a bullet batch. The best possible outer surface on the wire is required because at this stage, the strips of wire are lubricated and the lubricant is usually non-compressible and stays in the damaged wire for the life of the core and contributes adversely to both uniformity of weight and bullet balance. After trying dozens of others, I've always come back to wiping the wire with a wet patch saturated with Hoppe's No. 9. It seems well designed for wiping dirt, tarnish and, heaven forbid, scale from the wire. It is lubricant enough for the feed tube and cutting edge for the core cutter. If kept in a sealed container, enough No. 9 will still be on the cores for the later core forming stages. Your cut cores should be nearly uniform in weight for finished bullets but, of course, 1.5 grains heavier. For the sake of prolonging the life of your core forming swages, keep them clean. It is an expensive die and, with care, has a long life.

CORE FORMING

When bullet making dies and techniques are properly in tune, a surprisingly small amount of power is required for operating the press. Believe this because a core cut too long and power applied too ruggedly can break both the die and press. If you do by error get a slug in that is too long or perhaps a double feed, stop the power and eject the slug or back off the die and gradually extrude the excess lead by steps as the die is tightened.

The swaged cores must be matched as near as possible to the interior of the jackets they are to be used with and they shouldn't fit loose enough to fall out of a jacket or so tight that more than very moderate pressure will seat them and without compressing air in the bottom of the jacket.

After years of testing I feel positive that the best cores are processed by at least two separate settings of the die. That is when the overweight of the cut cores come into the picture. I usually do mine in two stages and the system is to use a thin shim washer underneath the properly set die for finished weight bullet. At this stage about ¾ to 1 grain is extruded. If the extrusion holes in the die are not obstructed and are properly drilled, the strings of extruded lead should all be about the same length and diameter. When they are running about the caliber diameter of the bullet you are to make, things are going pretty well and you have cut your cores very uniformly. I haven't had a bleed hole plug in years which speaks highly for the quality and cleanliness of the lead wire that I use. Look there for your first source of trouble.

These plugged extrusion holes aren't too easy to clear sometimes and I advise you to go at it carefully. Try first to force a clearance by 1½ length slug with a sharper than normal stroke. Often that works. If not, try filling the cavity about half full of a good grease or vaseline, insert a formed core base uppermost and use a sharp stroke. Repeat this several times if necessary. Use penetrating oil but never use a drill, needle or hardened steel. A soft steel wire sharpened but never anything that will break off and compound your troubles. A real good way to ruin your die is to apply heat and melt the blocked hole out. Mercury will amalgamate with lead and possibly clear

(Please turn to page 12)

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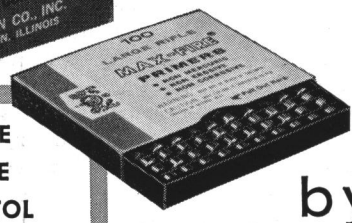

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Random Shots

By Betty Summerall Duncan

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It's inventory time!

You've read the statistics compiled on 1965's winning scores, but—statistics remind me of computers. They are too impersonal.

To the computer, additional 10's are excess baggage, not intended to be tacked on to an **800** 4-position gallery score. In all fairness, the mechanical statistician has not struggled as you have to break 190 offhand and, therefore, fails to realize that a perfect 800 should not have been fired in the first place. It is impossible! . . . As far as the machine is concerned, numbers are numbers. Compression does not permit such superfluous frills as **44 additional 10's in the Standing position.** I dare say that LONES W. WIGGER, JR., won't soon forget those additional center shots which he "sweated out" on March 20th at the Conover, N. C. sectional . . . The most vivid account was in the Roseland (N. J.) Newsletter, by Ken Stannard who interviewed Wig the following day. He was impressed.

In the judgment from the firing line, the **two most breathtaking scores of all-time were fired in 1965!** Indoors, Wigger's 800 plus 44 10's Standing will reign for awhile. Firing it gave Lones more satisfaction than anything that he has ever done, with the exception of his Olympic victories.

The computer was unable to find an appropriate category under which to file the **outdoor** phenomenon—the first and only perfect 3200 ever fired over the Critchfield Course. It obviously could not be aligned with regional scores—it had one too many zeros for that. There was but one recourse—: omit it entirely . . .

Shooting the any sight matches on the first day of the Silver Dollar Round-Up at Winter Haven, Florida, National Smallbore Prone Champion WILLIAM E. KRILLING wondered why he was getting so few X's at 50-yds. Strange . . . his scope appeared so fuzzy. We won't name the prankster responsible for applying a "paster" to the forward lens of Bill's rifle scope . . . It bears emphasizing that with the reverse procedure, the 100-yd. iron was scheduled as the final match on the second day. Try to duplicate that pressure-wise!!! Such superhuman effort produced a 3200 X 3200 with an X-count of 257. . . . Even though it is unbelievable, it is official. But, what makes it even more inconceivable is—: I'm not sure that I should disillusion you . . . How is your blood pressure??? . . . Please, be seated . . . Very well, let us proceed, but gently . . . Instead of shooting the most accurate of all smallbore prone rifles, as you would expect, Bill learned to his amazement at the Anschutz factory last summer that his "3200 gun" was a **dud**!!! Checked over in machine rest, the rifle was definitely **not shooting**. . . . Could it be that that revelation is what spurred Krilling on to win the National Prone Championship the following month with a left-over rifle (rejected by everyone else at USA MTU), which grouped well over an inch? If he ever lacked confidence in his own ability, that news in Wiesbaden should have filled in the gaps. Whatever it was, **Bill Krilling** has earned #1 spot in smallbore prone shooting's HALL OF FAME.

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Champion of the 1965 Scottish National **Meeting** at Ayr was none other than WILLIAM P. SCHWEITZER! (See December P. S. for picture). This news is just in through the courtesy of **Bob Sinclaire.** It seems that Bill's scores were off at Bisley in the mornings, but in the afternoons he settled down and shot. "I advised him to eat bigger breakfasts," Bob commented. "Maybe this helped!" . . . We don't have a bulletin from Scotland but, hear this—: Schweitzer had a **399** in the Dewar, on British targets, and we mention only for emphasis that it was with metallic sights (assuming that you would know). This could very well be a Scottish record . . . . **Footnote:** Bill Shcweitzer, who fired at Bisley 29 years ago with the Pershing Team, achieved the above minus leather coat, hair trigger, etc.

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Our thanks to **Bob Hutton,** well-known technical writer and owner of the **Hutton Rifle Ranch** in the Santa Monica Mountains (Calif.), for mailing us the really outstanding feature on GARY ANDERSON by Ed Neal in the **San Francisco Examiner.** It was Mr. Neal who revealed to the San Francisco Theological Seminary in San Anselmo, Calif., that they have a World Champion and Olympic gold medalist in their midst. They would never have learned it from Gary Anderson.

In an interview with Neal, Gary drew an analogy between studying for the ministry and shooting—: "To me, putting the two together makes sense. Competition is important. It calls for discipline. Nothing is more important in my calling than discipline."

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With this statement, Andy has given you the key to winning. It is impossible to win consistently without strict mental discipline . . . Actually, those of us who have concentration problems might profit from wearing ear plugs as Wigger does (I can seriously suggest a widely-advertised brand to stay away from) for prone shooting, or ear muffs, which Andy always wears. Also, a bit more range courtesy on the part of those not shooting could be conducive to greater relaxation and sharper concentration for those on the firing line.

***

It is decidedly to Anderson's credit that he shot within 1 point of winning the California State International Championships at Richmond. As his equipment had been in the M. T. U. supply room and shop at Ft. Benning for 2½ months, it was unfortunate that it failed to reach him in time for this important tournament. Being left-handed also presented a problem until Chris Petersen came to the rescue and lent him an Anschutz for 50-meters and a 6.5 Schultz-Larsen, which he fired with a strange load. The Anschutz being the superior of the two rifles, Gary's 1156 behind Wigger's 1157 was still fine shooting—for both of them, really. With the Schultz-Larsen, it was a noble effort on the part of Anderson to tie Wigger, as they came in third and fourth, with 567's, behind Krilling and Lewis' respective 575 and 573 . . . A correction on Aggregates scores listed in December—: Wigger—1724; Anderson—1723.

****

One of the most exciting and glamorous shooting facilities in the nation is shaping up in Dallas with **Bob Lang** at the helm and **Ed Caygle** as co-pilot! The **Elm Fork Shooting Park, Inc.,** a Winchester Gun Club, is located at 10751 Luna Road, Dallas, Texas 75220. In 1961-1963, the former Captain Lang was officer-in-charge of the Army International Rifle Team. M/Sgt. Caygle, who needs no introduction, is retiring from USAF on January 31st. While on 60 days terminal leave, Ed has been on active duty, participating in putting into motion the shooting park's sweeping new program. I have a feeling that it is going to be an extremely popular tournament headquarters.

Take your pencils in hand to underscore some of the important dates, for example:

March 12-13—Preliminary tryouts (rifle)

March 19-20—3200 aggregate

July 21, 22, 23, 24—6400 aggregate

October 12, 14, 15, 16—6400 aggregate

October 22-23—Int'l rifle

This will give you an idea of what is in store ,from the viewpoint of the rifle shooter. Another feature of these and other matches is the timing, which is calculated not only to draw shooters en route to other tournaments, but to offer them added incentive to embark on a shooting circuit.

A really all-round shooting activity is already functioning, with 4 trap and 4 skeet fields, 50 pistol points, 100 smallbore rifle points, and 10 high power points. Expansion includes 20 points with returnable targets to 300-meters, 50 smallbore points for International, and all 20 of the center fire points for Int'l; at least one running roebuck range by fall, and benchrest points to 300-meters. Sounds fascinating, does it not? . . . More on that and the country club-type clubhouses later. . .

****

Another unrealistic, in fact, "way out," anti-firearms cartoon—(now, who do you suppose is making the pay off to these cartoonists?)—so, stand by for a barrage of

ridiculous propaganda. Either a poll, some politician making a play for the headlines with little if any regard for the truth, or some noble-sounding (to the uninformed) threat, almost invariably follows the planned campaign to play upon the public's sympathetic nature.

Actually, if some gun magazines would refuse to print certain ads which supply inflammatory material to the opposition, it would be both to their advantage and to ours.

Have you read your wife's copy of the November **McCall's** Magazine? If you haven't, do so immediately. You wouldn't have believed that the Senator from Connecticut would be so flagrant with the facts. It is indeed difficult to remain dignified in the wage of such undignified tactics. And, what a sob story! Don't you consider that we should be entitled to equal time? There is nothing that I would like better than to write a rebuttal in **McCall's** from the woman's point of view—and I do swear to tell the truth, nothing but the truth (which is more than I can say for the Senator). And, incidentally, I have just renewed my subscription to **McCall's** for five years, a testimony to my belief in the magazine's integrity for presenting both sides of a, shall we say, controversial issue.

***

In **New Jersey**, the **Citizens Committee for Firearms Legislation** is becoming increasingly more successful and is making its influence felt in an effective manner. It is their function to prevent the passage of vicious and unwise gun legislation in their state, meanwhile serving to educate those unfamiliar with the issues on the broader, national scale. This Committee is recognized by the Governor and the Attorney General as a quasi legal body, with any firearms legislation being referred to them for review and suggestions before submission to the legislature for vote.

With **Louis A. Benton** as Chairman, and **L. Arthur Burton,** Secretary, the Committee is composed of representatives from the following organizations: Association New Jersey Rifle & Pistol Clubs, N. J. State Federation Sportsman's Clubs, N. J. Arms Collectors, N. J. Sportsmen, Gunsmiths, Firearms Dealers, the Armored Car Carriers, the Private Police Assoc., the American District Telegraph, the American Trap Shooting Association and others. Advisors are the National Rifle Association and the National Shooting Sports Foundation. A conservative estimate of the number of firearms enthusiasts whom they represent is over 280,000, and is steadily growing . . . This just shows what **can** be done with sufficient dedication. As Art Burton emphasizes, "We must be as dedicated to fighting this alarming attempt to disarm us as they are with the smear campaign going."

Other states would do well to follow suit and organize similar advisory groups—but, there is no time to lose! The New Jersey committee has graciously offered to assist those interested in contacting them with any help which they may offer from experience gained by their efforts . . . **Address:** Citizens Committee for Firearms Legislation, Post Office Box 44, Belle Mead, New Jersey.

I've heard many reports on the highly successful radio debate participated in by Art Burton, and Clayton E. Wheat, Jr., NRA Director and member of the Manhattan Rifle & Revolver Assoc., and also Bob Banjoc, a young fellow from N. J. . . . Their opposition on the "Randi" Show, WOR Radio, from 12 midnight to 0345 a. m. was to have been the Police Commissioner of New York City. Instead, the Commissioner sent a Mr. Fred Willing, lawyer, and Director of the Trial Lawyers Association of N. Y. He is also Advisor to the National Association of Defense Lawyers. He had never heard of the Sullivan Law!!! That gives you a clue as to how well our team conducted themselves, and especially as they had done their homework well. More about that next month . . . .

• • •

MIRAGE

(Robert Sears)

(Reprint from April 1961)

Principles

In order to know what mirage is, it is necessary to understand something of the refraction of light. To begin with, we are accustomed to thinking of the path of a light ray as a straight line, which is rarely true. The course of a ray of light is deviated by any transparent medium, even air, through which it passes. Each transparent substance has a greater or lesser ability to change the path of the ray. This is numerically expressed as its index of refraction. Flint glass has an index of refraction of about 1.579880, Crown glass about 1.516149, water 1.3324, and air only about 1.000292. The word "about" is not used in an attempt to hedge, but is made necessary by the fact that this figure varies with the temperature of the subsance. In glass, temperature difference can actually make the focal length of our scopes slightly shorter in cold weather. The difference in indices of refraction of different kinds of glass is utilized in the optical design of telescopes to correct for normal aberrations. Compound lenses, made up of different types of glass, make it possible for the aberrations of one element to compensate for those of the other.

The refractive power of water, while not actually concerned with mirage, is useful for illustration purposes. An oar in the still water of a mill pond appears deflected in a straight line. If there is a steady current, one kind of distortion is apparent, and if the water is turbulent, as when it flows over a rocky bottom, another kind is added. This is equally true of motion or turbulence if the medium is air. On top of this, the amount of refraction in air is af-

Please turn to page 10

NEW

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. . . make long shots pay off!

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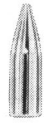
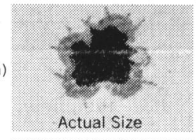
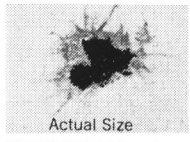


22 Cal.
53 gr. (Match)
.222 Rem.
Mod. 722



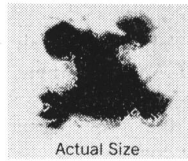
Actual Size

6mm 75 gr.
6mm Rem.
40XB



Actual Size

25 Cal.
75 gr.
25.06 Rem.
40XB



Actual Size

For years we've tested hollow point varmint bullets—and maybe you have too. Some were very accurate. Others gave quick expansion on contact. But none of them had both of these varmint-killing virtues—till we began making our NEW hollow points.

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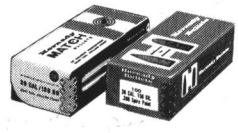
Behind this effective combination are 3 exclusive design features: (1) Secant Ogive spire point shape (2) with a small uniform (and ballistically superior) hollow point opening for flat, deflection-resisting, energy-retaining performance; (3) Unique jacket design that allows these HP's to literally explode on contact.

Ask your dealer for the new Hornady Hollow Points. They can help make this your most satisfying varmint season in many a year.

Bullets for Handloading—
Send for list.



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National Bench Rest Shooters Association, Inc.

PRESIDENT'S CORNER

I'm really feeling neglected. No one has yet taken me to task. For what, you say? Haven't you even noticed? It's been months since the President's Corner appeared.

Neither NBRSA, Inc. nor I can afford the services of a psychiatrist. So you better get busy and raise h--- with me. I can't believe that our membership is the strong but **silent type.** Nuff said.

The 1966 Heavy Benchrest Nationals will be in the Eastern Region. Dates and place will be fixed at the Winter Meeting. The 1966 Varmint Nationals will be in the Gulf Coast Region. As soon as dates and schedules are approved they will be announced.

By the way—we started January 1965 with 988 members. We began this year with 1032. A net gain of 44 members! In April of 1965 we were up to 1055! I want to thank those members that sparked this rise. But the rest of the membership better get going. Remember—we wanted to double the membership. Let's do it this year.

There has been a marked improvement in P. S.—the new articles—the composition—yes, even the type size. Now let's get those old memberships renewed and new ones in.

The membership increase at its present rate is another reason why your officers and directors may need that Psychiatrist.

How about it? Will you do your part?

Sincerely,

Brunon V. Boroszewski

• •

SOUTHWEST HUNTER PROGRAM

Sweany, Hobbs, Sheperd on the West Coast are with their committee and participating clubs doing a fine job on the Hunter program. They have designated this program the Southwest Region of the N. B. R. S. A., Inc. Hunter Program. Clubs, individuals and other regions would do well to investigate and promote this Hunter activity. It is a fine introduction to Benchrest activity.

Brunon V. Boroszewski

• • •

CR&PA ADOPTS HUNTER RIFLE

We were advised by telephone on January 14th that at a recent meeting of the California Rifle and Pistol Association the Hunter Rifle program was adopted as an official part of the activity program of that organization and a Bench Rest Committee was appointed to promote and direct Hunter Rifle competitions, not only in the State of California but in the entire NBRSA Southwest Region. John B. Sweany, 4498 Silverado Trail N., Calistoga, Calif. 94515, is the chairman of that CR&PA Bench Rest Committee. P. H. T.

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Area Code 415, 525-5568

Secretary-Treasurer

Bernice E. McMullen
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Minerva, Ohio 44657
Area Code 216, 868-6132

NBRSA MEMBERSHIP DUES:

Individual annual dues $6.00 (includes magazine subscription for membership term). Associate member (wife or husband, son or daughter under 18 years of age, of member in good standing—no magazine) $2.50. Life membership $75.00. Annual club affiliation fee $10.00.

• • •

CALIFORNIA HUNTING RIFLE CHAMPIONSHIP

The first California Rifle and Pistol Association sanctioned State Championship tournament for Hunting Rifles from bench rest was fired on the Richmond Rod and Gun Club range December 12th with 50 shooters competing for the various class awards.

Bill Bliss, Menlo Park, won the Junior Championship with the high over all score of 235-12X of a possible 250 count. His rifle was a Savage 110 in 6mm/250, gunsmithed by George Fullmer of Oakland, using a 75 gr. Speer bullet and H380 powder. Greg Lowthain, Alameda, was second high Junior and fifth over all with a score of 230-9x, shooting another 6mm/250 cal. gunsmithed by his father.

Senior State Scope Champion was second place Don McLennon, Concord, with score of 234-11x. He was shooting another 6mm/250 cal., by Fullmer, with the 75 gr. Speer bullets and H380 powder combination. Third ranking shooter was Dave Merrill, San Pablo, with 233-12x and fourth was Kit Puett, Lakeport, with 233-8x. Both Merrill and Puet shot .250 cal. guns.

Lady Champion was Laurice Merrill (Mrs. Dave) in sixth ranking position, with score of 229-8x. She shot the same outfit as Dave did.

Carlos Pedrosa, San Rafael, was high iron sight shooter with score of 201-5x. He shot a Winchester 88 in .308 caliber.

(Editor's comment: Rather surprising was the number of rifles chambered for the 6mm/250 cartridge at this shoot, and the almost universal use of H380 powder and 75 gr. bullets—mostly by Speer—in them. Most of the rifles were listed as gunsmithed by George Fullmer, with a few by Bob Lowthain.

George Fullmer has been a 6mm International enthusiast since the introduction of that wildcat cartridge several years ago. Since the 6mm Int. is based on the 250/3000 Savage case with very little alteration other than necking down to .243, I'd guess the 6/250 to be a very close relative of the 6mm Int. cartridge. Perhaps George will give us more detailed information on this 6mm/250 cartridge with some notes on experience that seems to have made the H380 powder and 75 gr. bullet load combination most desirable.)

• • •

"THE SNOW BALL LEAGUE"

Shooters Service & Dewey, Inc., Clinton Corners, New York, is sponsoring the third annual winter bench rest league with eight matches during the period January 23rd through May 15th inclusive. Shooting, on Sunday afternoons, will be at the Millerton (New York) Rod & Gun Club where there is a comfortable, spacious club house with attached covered firing line. Shooting is for **ANY RIFLE** of total weight not exceeding 14 pounds. Interested riflemen may obtain programs from SS&D, Inc., Clinton Corners, N. Y. This is an opportunity for some winter outdoor competition for riflemen in the Southern New England, Eastern and Metropolitan New York area.

P. H. T.

NBRSA WORLD RECORDS • • AS OF JANUARY 1, 1966

HEAVY BENCHREST RIFLES

	RESTRICTED	UNRESTRICTED	HEAVY VARMINT	LIGHT VARMINT	SPORTER
GROUPS (In inches)					
100 yards—5 shots	— —	.0630 Zeiser 8/30/58	.1006 Bottoms 7/20/63	.0950 Beard 7/17/65	.1707 Regan 6/27/64
100 yards—10 shots	.1430 Bench 8/15/64	.1566 Pindell 8/11/62	.2955 Novak 6/28/58	— —	— —
200 yards—5 shots	— —	.2383 Kerr 8/9/59	.1923 Gillman 6/27/64	.3530 Rollins 8/9/63	.3072 Broderick 7/4/65
200 yards—10 shots	— —	.3003 D. Walker 10/21/62	.7996 Pheasant 7/19/59	— —	— —
300 meters—5 shots	.6050 Gottschall 5/9/65	.6651 Yockey 6/21/63	1.0597 Rollins 5/9/65	— —	— —
300 meters—10 shots	— —	.9175 Rinehart 8/30/57	— —	— —	— —
AGGREGATES (In MOA)					
5-5-100 yards	— —	.1973 Glenn 7/19/58	.3189 Hunt 7/12/64	.2896 Rinehart 10/2/65	.3187 Oaklev 7/3/65
5-10-100 yards	— —	.2289 Roberts 8/11/62	— —	— —	— —
5-5-200 yards	— —	.2602 Yockey 10/8/60	.2584 Suchan 6/26/65	.4171 Gillman 8/21/65	.3950 D. Hall 8/9/63
5-10-200 yards	— —	.2496 E. Walker 8/11/62	— —	— —	— —
5-5-300 meters	.3770 Gottschall 5/9/65	.4161 Rucker 5/10/64	.5260 R. Hall 5/9/65	— —	— —
5-10-300 meters	.5352 Gottschall 5/9/65	.5571 Yockey 5/9/65	— —	— —	— —
GRAND AGGREGATES (MOA)					
5-5-(100-200)	— —	.2873 Culver 7/28/57	.2491 Suchan 6/26/65	.3734 Gillman 8/21/65	.4131 Gillman 7/4/65
5-10-(100-200)	— —	.2563 Roberts 8/11/62	— —	— —	— —
5-5-(200-300)	.3639 Gottschall 5/9/65	.4221 Yockey 5/9/65	.4986 Rollins 5/9/65	— —	— —
5-10-(200-300)	.5464 Pindell 5/9/65	.5528 Yockey 5/9/65	— —	— —	— —

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CARD FOR LIST

Mirage

fected by the humidity of the atmosphere. While the refractive power of air is small, it begins to look as if its positive value is the hardest to pin down of any. Mirage is an illusory effect caused by the refraction of light as it passes through air.

As if things were not already complicated enough, let's toss in one more variable. The angle at which a light ray passes through the air affects the amount that the ray is refracted. If a ray enters the atmosphere vertically, as a star at its zenith, no refraction takes place. This is the only time that light travels through the atmosphere in a straight line. As the angle grows larger, the amount of refraction becomes greater at an ever-increasing rate, until it reaches its maximum at the horizontal. The normal path of a ray through the atmosphere is bent downward, toward the earth. To visualize the amount, consider this fact: When the sun sets and its lower edge appears to touch the horizon, **the entire sun is actually below the line of sight, under the horizon.** The rate of increase may, at times, be observed in that the lower part of the sun is refracted enough more than the upper part so that the sun looks slightly egg-shaped.

Practical Effects

As the Beginners' Corner has pointed out, it may be better to first know about the practical effects of a natural phenomenon before delving too deeply into the theory behind it. Understanding the theory, more often than not, is the result of natural curiosity after knowing to your own satisfaction what the perceptible effects are.

At the outset, mirage, like the wind, is something that none of us are going to eliminate or control, so we might better see what we can do about compensating for it. There are many close analogies of the effects of wind and mirage, but these primary facts must always be kept in mind:

1. **Wind physically moves the bullet**
2. **Mirage optically moves the target**

If the wind were from exactly the same direction and at a constant speed during a course of fire, the group size would be unaffected. This is also true of mirage. The problem to the rifleman is not that wind and mirage exist but in their variations in amount and direction. Wind and mirage act in conjunction to change the point of impact of a bullet. A wind which moves a bullet to the left also moves the target image to the left by moving the medium (air) through which the light rays travel. Given the exetrior ballistics of the bullet and the speed and direction of the wind, the amount of wind drift can be calculated with a great deal of certainty. We are surprised at how much this can be, and sometimes even more surprised to find that in actual practice the displacement seems to be much greater than the figures indicate. The difference is the amount caused by mirage. In other words, the bullet's point of impact on the target is changed partly because the wind carries the bullet and partly because you aim it out there.

It is normal for cold layers of air to arrange themselves closer to the ground. Colder air which is comparatively denser causes light rays to be bent downward. However, the opposite effect can take place when the warmer air is near the ground, as when the sun shines on a sandy range. The ability of sand to warm the air above it accounts for the completely detached images often seen in the desert. At any given moment, a target image may be displaced upward at one point between the rifle and the target and downward at another. Similarly, the wind can move both the bullet and the target image to the left at one point and to the right at another. The end result at any one moment is the sum total of these factors. It has always seemed to me that while the total amount is greater in a horizontal direction because the wind and mirage act in conjunction, the vertical variations are the hardest to outguess. Extensive experience plus a natural facility for such things makes some riflemen effective wind and mirage "dopers." By watching the direction and speed of flow, they "hold into it" by guesstimation, and thereby turn in some very creditable scores. For me, the average results have been better by trying to let off each shot when conditions are as nearly alike as possible. After watching the aiming point shift around for a few seconds, it can be sensed where its normal or real position is. I try to stick with this.

Under most conditions, the flow of mirage should be noted not only for its own importance but also because it provides the best means of gauging the wind. This is the only method that lets us judge the sum total of both at the instant we let off each shot.

One last analogy between wind and mirage. We will never learn to shoot well under windy conditions by always choosing a calm day to do our practice shooting. Neither will we learn to judge mirage by passing up practice while the wiggle waves are against us. The wonderfully small groups we make under ideal conditions are valuable as indications of inherent accuracy of the rifle and load, but it also takes close control over the human factors to win under match conditions. This is another way of stating my conviction that the number one problem of the bench rest shooter today is not rifles or ammunition but sighting error.

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Larger Calibers not Air Gaged available as in the past from us, up to .458 Win. Price on application. EXTRAS — $10.00 for Premium Air Gaged Bbls. or Blanks. $20.00 for Stainless Steel. Other minor extra chgs. as per our list.

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Proposed Rifle

almost one and three quarters inches long which is much longer than the highly efficient 200 gr. Sierra Match King.

The bullet, as partially described, is only a third of my problems. The barrel is next and here is where I will really come in for some criticism by the old school of conformists who still insist that if a 55 gr. bullet shoots good in a 14 inch twist in a .224 cal., "that's what I should use." However, with my proposed bullet and my knowledge of proportions, I prescribe a 1 in 6" twist. If asked "why?" I would not resort again to the computer or a bunch of formulas. I could only answer that by comparisons and scaling up or down that for such a long bullet it would take a 6" twist to stabilize it. A 7" had to be used for a 25 cal. 160 gr. and an 8" for 6.5 139 gr. So when we scaled down to .22 cal. in barrel twist from a larger caliber we must scale it to give proper angle or twist according to angle of departure and, of course, consider length, etc. An 8" in 6.5 would equal a little less than 7" in 224 so I am dropping to 6" because I have a much longer bullet in proportion to the 6.5 Norma Match 139 gr. I have had discussions with people who should know that contend the twist is the same between calibers, or should be the same. Our average calibers built around .30 uses an average of 10 or 12. An exception wrong way pitch is the 14" in most of our center fire 224 class. This is because of the short, easy to stabilize bullet. An extreme example the other way, we wouldn't take a 10" cannon and expect to stabilize a three diameter bullet in a 10" or 12" twist. This would be ridiculous, so one must see we have to proportion or scale. So much for the bullet and barrel and twist.

Next, or third item, is the cartridge. I will choose the 30-06 case for several reasons. It will give very good all around results. Of course, I realize again I am in for a real working over by the conformists who have read too much of our sports writers term "overbore capacity." This, of course, is pure fallacy if a proper balance of the proper powder is used. I choose the 30-06 case first because it fits all our standard actions without alterations. Good G. I. Match cases are both tough and easy to obtain. Secondly, the case would hold exactly 60 grains and at the same time give maximum allowable pressures. Oh yes, in order not to have that so-called "overbore capacity," I have figured all this for H870 or H202 ball powder. If you used 4895 you could get by with a case one half the size with efficiency, but by the same token, only about half or two thirds the necessary velocity. This velocity should be between 3400 and 3500 M. V.

Another word or two more about the proposed bullet. This is all important and probably the most important link for a successful project. I would prefer, strictly for match work, a bullet with steel jacket like the Norma Match 6.5, 139 gr. Second choice would be a thick jacketed Gilding metal with small hollow point with long ogive and a boat tail. Such a bullet could be super accurate for target work and also be an excellent long range hunting bullet for plains and mountain work.

About barrel life . . . on my 6.5 W. W. H., which has about the same scale proportions of bullet weight and powder (84 gr. H870 with 139 gr. 6.5 bullet vs. 60 gr. H870 with 100 gr. 224 bullet) I have fired over 1200 rounds through present barrel and the last 1000 yd. match it shot 99 out of 100. I think the one 4 was my fault. There is no reason that my proposed .224 with cool burning ball powder won't do the same.

I would be happy to pioneer this project and build the rifle, provided I could get a good premium grade target .224" tough stainless barrel in 6" twist. Also, I would need a minimum of 2000 top quality bullets as specified above. I have enough faith in this that I would discard all other calibers for hunting and Wimbledon type matches. Getting bullets and barrel is the big question.

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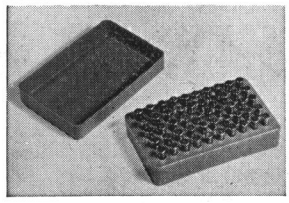

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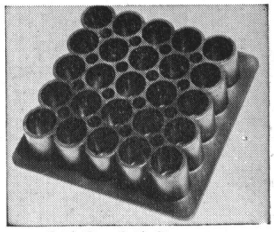

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the hole but it can be deadly poisonous if carelessly used.

2nd CORE SWAGING STAGE

If your scales are very accurate you can make several tests that will surprise you. If two previously processed cores are placed in the die, one flat end up, the other round end up, they will form two different weight cores. If a core that already has been double processed is placed ever so carefully in the die and even a gentle power stroke used, the resultant core will be less than the normal weight.

Double stroking is not the same as double processing and the results are not as good.

No lubricant is required after the initial coat prior to slug cutting. To use it in either of the core forming stages will impair uniformity of weight.

Don't mishandle and deform the cores after so carefully making them. No available amount of pressure can force out those bruised places at the core seating stage.

DEGREASING CORES

Here is a step over which there is a lot of controversy. Sierra make their bullets by using a lubricant on both jacket and core. I am dead against the often used caustic system that not only degreases the cores but immediately forms oxidization on them and builds up a rough surface. The copper and lead surfaces must work smoothly together as they change relative positions quite radically during three stages, the core seating stage, the bullet forming stage and the very marked change when the bullet takes the shape of the interior of the barrel.

I know of no way to lubricate the cores uniformly but I can degrease them quite uniformly with carbon-tetrachloride or a simple system that is less arduous to use and so far as I know adequately uniform although I'm not too sure that something similar to a lubricating film is not left on the cores. Wet them, then immerse them in a coffee can full of hot water in which there is a double dose of Mr. Clean or Lestoil. Let them set for about ½ hour with gentle occasional changes of the position of the cores about every ten minutes. Rinse thoroughly with hot water four or five times before drying them completely before sealing them for future use. Remember, don't jostle them and deform them.

I, too, used to believe this myth about the slightest lubricant forming gas and bulged jackets and erratic bullet flight. It didn't work out in the tests I made. I've not seen signs of melted cores in hundreds of trapped bullets either. No jacketed bullet, no matter how oversize, was ever found that had the barrel grooves completely sealed.

SELECTING JACKETS

I haven't been won over completely about disturbing the "skin" on either the inside or outside of the jackets as they come from the factory. The normal stresses become more unbalanced even though the wall thickness uniformity may in certain jackets be improved. In theory, the weights become more uniform but I think weight variance alone, certainly within the tolerances acceptable for finished bullets, is much over emphasized. Since there are only very few such jacket resurfacing devices in existence, let's say what the beginner needs to know is what good and what bad is to be encountered in jackets as they are received from the dealer or retailer.

A real purist measures each jacket from a lot of a thousand and sorts them into groups. Better than two ten thousandths out in wall thickness is tops for the most serious competitions, three and four are real good but worse than six I don't even put the labor into.

They are measured by various devices and some I have seen have been more faulty than the jackets they were supposed to measure. I measure mine with a very fine dial indicator at from seven to twenty-eight places around each jacket. I never found turning them by any method other than hand satisfactory. The mandrel is stationary, the indicator point is wedge shaped instead of the usual dome and, of course, the edge of the wedge tracks around the jacket. I seldom find that I cannot repeat readings.

I admit to being fussy but I can't see putting labor into poor jackets. I confess, too, that I can't distinguish by shooting test bullets which were made from a spot check lot of jackets. Many makers use the spot check system also to determine good jacket lots although there is considerable difference in their standards.

I suggest selecting at random a handful of fifty and measuring by the best measure available to you, each one. If any measure more than .0006, reject the lot. Do the same if more than 30 read .0004 out. If you have to own the lot, measure each one as I suggested earlier. Good jackets aren't easy to come by but only those that are good make good bullets.

Sometimes jackets are not cleaned well but such a condition is rarely found now. Also infrequently are those found with bad burrs on the mouth caused from a poor cut-off job. Sierra is to be commended for always shipping a generous amount over the 1000 charged for in the cartons.

CORE INSERTION, alias STUFFING

This is a time consuming job that is a little dull but important as a visual inspection stage for both jackets and cores and it should be uniformly done. Make yourself a block of wood or plastic, honey-comb

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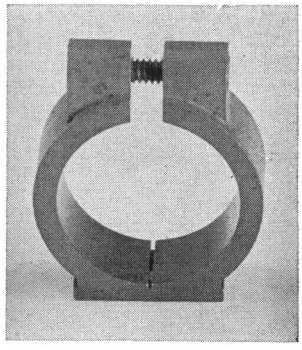

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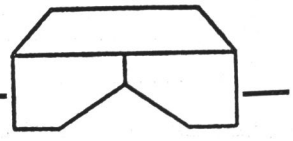

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with ¼" holes about ⅜" deep. (About 250 holes work well.) Insert the jackets open end up and drop a core in each jacket. Use a drift pin or make one of nylon or Micarta just the size to fit smoothly in the jacket and crunch the degreased core lightly into the bottom of the jacket. If everything is in order, they should stay in place as you dump the block between the center pages of an old copy of "LIFE" used to chute the jackets into a suitable container. Some makers omit this stage as such and merely mate the jacket and core before the core seating stage. I have a rotating ferris wheel device which presses the cores to a partial seating condition that would make "Rube Goldberg" blush with shame but it works so well that I have never rebuilt it.

CORE SEATING

This is the stage that spoils more or makes more good bullets than any two other stages. The die is the least costly and the hardest to adjust. The saving in the die cost is more than offset by the many punches required because of the different wall thickness of jacket lots, a desire of the bullet maker to arrive at different weights, and the design of the die which requires friction enough at the walls of the jacket as they contact the die to overcome the friction of the inner walls on the punch that must so firmly upset the lead that made friction in both places. Confused?

The jacket as you have by this time noted is tapered almost from the mouth to the bottom. The lead must be so tightly compressed in the lower part of this jacket that the pressure bulges the jacket outwards below the lead line and creates a slight bottle neck effect from the lead line to the mouth. This is the first example of the expanding up principle (E. U.) which is essential for good shooting bullets. In effect, this principle calls for progressive pressure from the core to the jacket at the next stage also. The diameter of the jacket changes during these stages from .222" to .2238" to .2246".

A most essential requirement is that there be no bleed-by at the punch face, also that the punch doesn't score the copper jacket and with it all a maximum expansion. We make things more difficult by having slightly and uniformly lubricated each jacket at this operation. Is it any wonder that eight to a dozen different diameter punches might be required to find one to successfully accomplish this mission? Just the right amount of lubricant often spells the difference between success and failure. When success is achieved you will wonder where all the difficulty came from with the units lifting off so smoothly but I warn you that the next lot of jackets, lead lot, or so little as 2/10 grain difference in weight will start you trouble shooting again.

There are two schools of thought about the face of the plunger that backs up the base of the jackets in these dies. The original plungers had flat faces on them but due to the thickness of the copper at the base of the jacket the base had a slightly rounded heel.

Later plungers were introduced which had a cup type face ground into them. This was claimed to be an improvement because a curved and somewhat accented rounded heel was impressed on the base of the jacket. It is the opinion of many bullet makers that the improvement feature turned out to be a failure because the most important place of all bullets is the heel and that spot was made less uniform in shape and thus escaping gas as the bullet leaves the muzzle starts an accuracy deterent yaw.

Take your choice. I've made mine but

Turn page please

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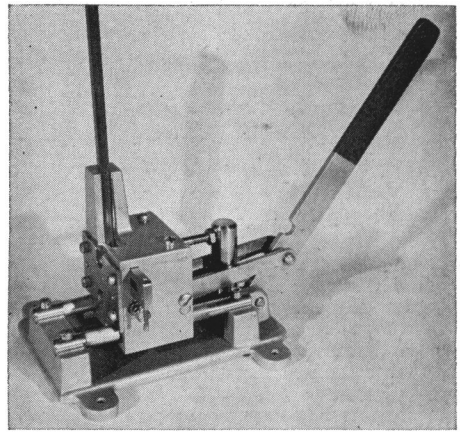

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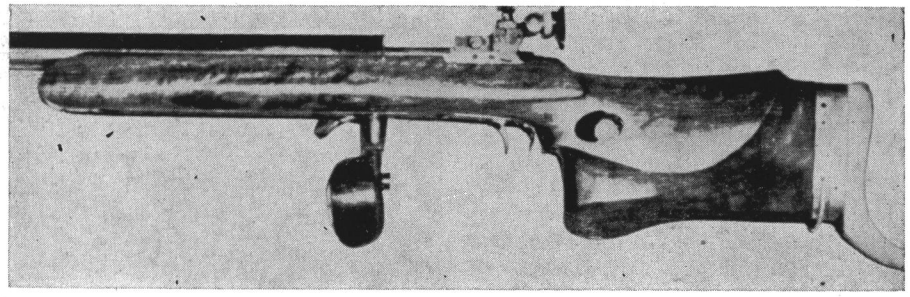

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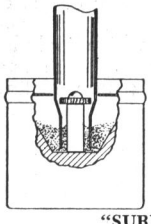

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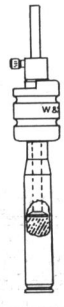

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if a customer insists I can make them unimproved-improved. In fairness I must say that the later type makes a smaller diameter at the extreme base of the bullet in any given die: i. e. a smaller expansion ring but this expansion ring doesn't bother most of us. In fact, we slightly favor it.

I predict that even though you made the foregoing adjustments well, you will have some instances where the jackets stick on the punch. At this stage, it is easy to ruin the jacket. I tried stripping them from the punch with a screw driver and diagonals but in desperation years ago, I made a simple tool from a discarded triangular hay mower cutting tooth. I bent it to about the arch of a claw hammer, used a triangular saw file to make a small notch at the apex which is tucked under the mouth of the offending jacket and firm against the punch sides. With a slight rolling action the jacket is stripped off and seldom is the mouth injured.

As this stage is completed you will find your .705" jackets have shortened to about .695" or less but are now .2238" or possibly .2239" in diameter.

SLIGHTLY DEGREASE SEATED CORE JACKETS

Indeed here is a long title for a quick job and a minimum of tool expense—just an old bath towel. Just dump several hundred into the folded towel and slide them back and forth a half dozen times. Enough grease will still be left on to work through the next stage and not have longitudinal creases that are too deep on the ogive. Do not try to degrease with any type of liquid.

BULLET SWAGING

At this stage you are about to see the final results but some careful adjustments are in order. All the care used before can be wasted at this stage if the die is not properly set. You will also be surprised to note that even though you have introduced a curve by forming the ogive, the finished length has grown from .695" to possibly .711" or more and the diameter to the full amount of the die plus .0002 or .0003" at the very base of the bullet. This is called the expansion ring. It often does not outlive entry into the case neck and probably never an inch of tight barrel travel.

The hollow points of the bullets can be very poorly shaped and still have them shoot well, but not the heels. They must be perfectly 90 degrees with the bore axis and have a uniformly true small radius all around the heel. The hole at the point should not be large enough to allow the ejection pin to impress itself and nearly punch through to the cavity. Neither should the die be set too tight and cause the point to flare as it is forced up into the ejection pin guide hole. The longitudinal creases must be there but as inconspicuous as possible. The ejection pin must be dressed flat from time to time and the press handle used in a manner that makes slow contact between the ejection pin and the point of the bullet. Thereafter a strong steady pressure until the bullet is ejected.

You won't be operating long before a bullet gets stuck in the die. The most frequent cause is from failure of the ejection pin to be clear of the jacket mouth as the point is formed. Sometimes the ejection stroke is too fast and sharp. Perhaps the jacket is too dry or the die too rough.

If you follow the instructions given by the manufacturers, you will lose a lot of time removing dies from the press, punching a hole through the cooper base of the stuck bullet, inserting a big soft iron or brass wood screw into the hole, turning the screw deep into the core, holding the head of the screw and tapping the base of the die until the stuck bullet clears. This is a positive method and may have to be resorted to in the worst cases.

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Years ago I discovered a method and published it that will often get one out of such troubles in seconds. First, make sure that the ejection pin is full up and clear of the jacket. Place a piece of core wire about ⅛" long on top of the base punch and with a normal firm stroke, force the bullet further into the die, then eject carefully.

You will observe that the base of the bullet is concave and this led me to a simple way of making concave based bullets. A BB or even No. 2 shot on the top of the base punch for each bullet makes very uniform bullets with that type base. They shoot well but I can't find any real need for bullets with such bases.

Further degrease the bullets in a towel and don't treat them rough—they are more easily deformed than you think. I think this is so important that I package them only 50 to a box in order that my customers receive them through the mail in better condition.

If you have followed the foregoing steps and made frequent and careful inspections as you progressed, you have a lot that is pretty uniform in weight, diameter, shape and length but double check your bullets before an important match. Perhaps even weigh them. Larger than average open points often indicate a shorter and lighter jacket and final bullet. Small holes often indicate the possibility of a heavier bullet but both of these signs can indicate uneven lubrication at both the core seating and pointing operation.

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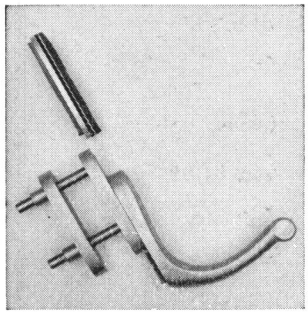

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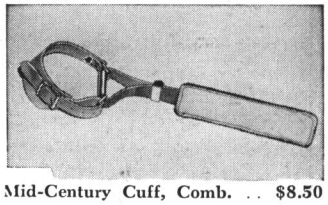

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Hunters and shooters paid more than $20 million in excise taxes on sporting arms and ammunition in 1964. Most of this money was used for game conservation, land acquisition, and wildlife research.

While the U. S. population increased more than 50 percent from 1930 to 1962, the number of homicides by firearms decreased about 30 percent.

"It is hard for me to understand that anyone could be so naive as to think that a bill making it difficult to purchase firearms for legitimate purposes would in any way impede the unlawful conduct of the criminal or prevent him from securing a gun."

—Walter S. Baring, U. S. Representative from Nevada

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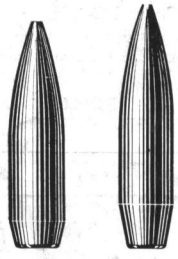
John A. Clerke
National Civilian
Bolt Rifle Champion

Mr. Clerke won the National Bolt Rifle Championship at the 1965 National Matches with a new Civilian Record of 793 out of a possible 800 with 91Vs. This is an aggregate of scores fired in these 7 matches: President's Match, Coast Artillery Trophy Match, Scott Trophy Match, Air Force Cup Match, Navy Cup Match, Nevada Trophy Match, and Crowell Trophy Match. He won the trophy in the Crowell Match.



J. A. Clerke used Sierra's 30 caliber 168 grain International for short ranges and the 30 caliber 190 grain Matchking for the 600 and 1000 yd. matches. These are but 2 of 54 perfect shooting Sierra Bullets available at your dealers for target and game.

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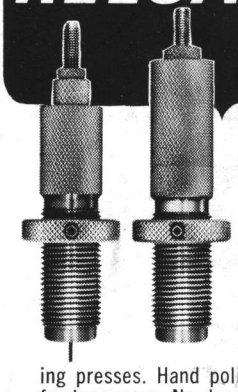

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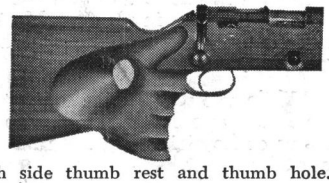

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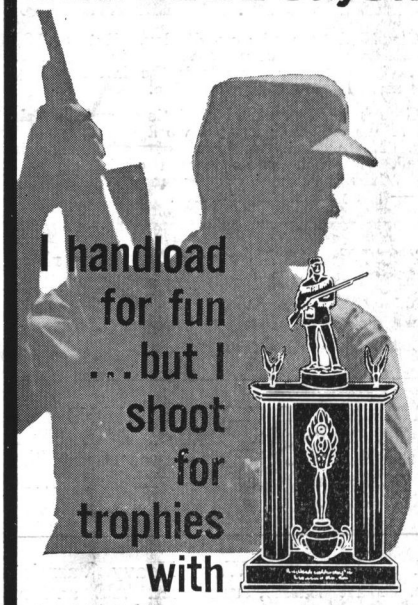

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